

Preliminary Amendment -1-  
showing changes for  
§ 371 Patent Application of PCT/EP00/01397  
Frommer, et al.  
filed August 17, 2001

1. An isolated and purified nNucleic acid or fragment thereof that~~which~~ codes for a plant or animal nuclear base transporter comprising~~selected from~~:

a) a nNucleic acid that~~which~~ is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

b) a nNucleic acid with a sequence that~~which~~ codes for a protein having~~with~~ a sequence according to SEQ ID NO:-8 or SEQ ID NO:-9;

c) a nNucleic acid that~~which~~ hybridizes with a nucleic acid according to b);

d) a nNucleic acid that~~which~~, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

e) a dDerivatives of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases; or

f) a nNucleic acid complementary to a nucleic acid according to one of the groups a) to e);

with the proviso that nucleic acids with a sequence according to one of the SEQ ID NO 3 to 5 are excluded.

2. The nNucleic acid according to Claim 1,  
~~characterized in that it includes a the-coding sequence of one of the sequences according to the SEQ~~

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ID NO: -1, 2, 6, 7, or 10, or a derivative of a coding sequence according to SEQ ID NO:1, 2, 6, 7, or 10  
~~derived from these~~ through substitution, addition, inversion and/or deletion of one or more bases.

3. The nNucleic acid according to one of the Claims 1-~~or 2~~, wherein said nucleic acid  
characterized in that it is a DNA.

4. A fFragment of a nucleic acid according to one of the claims 1 to 3, that codes for a plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a nucleic acid according to b);

d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases; or

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);

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with the proviso that nucleic acids with a  
sequence according to one of the SEQ ID NO 3 to 5 are  
excluded,

wherein said fragment is characterized in  
that in anti-sense orientation to a promoter it can  
inhibit the expression of a nuclear base transporter  
in a host cell.

5. The nucleic acid fFragment according to  
Claim 4, echaracterized in that it includes at least  
10 nucleotides., preferably at least 50 nucleotides,  
especially preferably at least 200 nucleotides.

6. A cConstruct comprisingntaining the  
sequence of at least a portion of an isolated and  
purified nucleic acid that codes for a plant or  
animal nuclear base transporter that itself  
comprises:

a) a nucleic acid that is obtainable  
through complementation of nuclear base transporter-  
deficient host cells with a plant or animal gene bank  
and selection of nuclear base transporter-positive  
host cells;

b) a nucleic acid with a sequence that  
codes for a protein having a sequence according to  
SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hyridizes with a  
nucleic acid according to b);

d) a nucleic acid that, in consideration of  
degeneration of the genetic code, would hybridize

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with a nucleic acid according to b) or with the  
sequence complementary to b);

e) a derivative of a nucleic acid according  
to a) to d) obtained through substitution, addition,  
inversion and/or deletion of one or more bases; or

f) a nucleic acid complementary to a  
nucleic acid according to one of the groups a) to e);

with the proviso that nucleic acids with a  
sequence according to one of the SEQ ID NO 3 to 5 are  
excluded,

wherein said nucleic acid ~~isa nucleic acid~~  
~~according to one of the Claims 1 to 3 and/or a~~  
~~fragment according to one of the claims 4 or 5,~~ under  
the control of anthe elements regulating expression.

7. The cConstruct according to Claim 6,  
~~characterized in that the nucleic acid or the~~  
~~fragment that~~ is in anti-sense orientation to the  
regulatory element.

8. The cConstruct according to one of the  
~~Claims 6 or 7, characterized in that it is available~~  
in a plasmid.

9. A hHost cell comprising~~ntaining~~ a  
nucleic acid or fragment thereof that codes for a  
plant or animal nuclear base transporter comprising:  
a) a nucleic acid that is obtainable  
through complementation of nuclear base transporter-  
deficient host cells with a plant or animal gene bank

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and selection of nuclear base transporter-positive  
host cells;

b) a nucleic acid with a sequence that  
codes for a protein having a sequence according to  
SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a  
nucleic acid according to b);

d) a nucleic acid that, in consideration of  
degeneration of the genetic code, would hybridize  
with a nucleic acid according to b) or with the  
sequence complementary to b);

e) a derivative of a nucleic acid according  
to a) to d) obtained through substitution, addition,  
inversion and/or deletion of one or more bases; or

f) a nucleic acid complementary to a  
nucleic acid according to one of the groups a) to e);

with the proviso that nucleic acids with a  
sequence according to one of the SEQ ID NO 3 to 5 are  
excluded.

~~according to one of the Claims 1 to 3  
and/or a nucleic acid with a sequence according to  
one of the SEQ ID NO 3 to 5 and/or a fragment of one  
of the aforementioned nucleic acids and/or a  
construct according to one of the Claims 6 to 8.~~

10. The hHost cell according to Claim 9,  
~~characterized in that it is selected from bacteria,~~  
yeast cells, mamalian cells and plant cells.

11. A tTransgenic plant, as well as  
transgenic plant parts, and/or seeds of the

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transgenic plant or host cell that  
comprises~~secontaining~~ a nucleic acid or fragment  
thereof that codes for a plant or animal nuclear base  
transporter comprising:

a) a nucleic acid that is obtainable  
through complementation of nuclear base transporter-  
deficient host cells with a plant or animal gene bank  
and selection of nuclear base transporter-positive  
host cells;

b) a nucleic acid with a sequence that  
codes for a protein having a sequence according to  
SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hyridizes with a  
nucleic acid according to b);

d) a nucleic acid that, in consideration of  
degeneration of the genetic code, would hybridize  
with a nucleic acid according to b) or with the  
sequence complementary to b);

e) a derivative of a nucleic acid according  
to a) to d) obtained through substitution, addition,  
inversion and/or deletion of one or more bases; or

f) a nucleic acid complementary to a  
nucleic acid according to one of the groups a) to e);

with the proviso that nucleic acids with a  
sequence according to one of the SEQ ID NO 3 to 5 are  
excluded.

~~according to one of the Claims 1 to 3~~  
~~and/or a nucleic acid with a sequence according to~~  
~~one of the SEQ ID NO 3 to 5 and/or a fragment of the~~  
~~aforementioned nucleic acids and/or a construct~~  
~~according to one of the Claims 6 to 8.~~

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12. The tTransgenic plant, part of the transgenic plant, host cell and/or seeds or host cell according to one of the Claims 9 to 11, wherein saideharaeterized in that the nucleic acid or the fragment or the construct is integrated into a site on the genome thatwhich does not correspond to its natural position.

13. A pProtein obtainable through expression in a host cell of a nucleic acid according to one of the Claims 1 to 3 or a nucleic acid havingwith a sequence selected from the group consisting ofaaccording to one on the SEQ ID NO:-3, SEQ ID NO:4 and SEQ ID NO:- to 5 in a host cell.

14. An aAntibodyies which that reacts with a protein obtainable through expression in a host cell of a nucleic acid or fragment thereof that codes for a plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hyridizes with a nucleic acid according to b);

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d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

e) a derivatives of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);  
or

g) a nucleic acid having a sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:4 and SEQ ID NO:5.

~~according to Claim 13.~~

15. A pProcess for the manufacture of a transgenic plant comprising, ~~which includes the following steps:~~

A. -insertion of a nucleic acid or fragment thereof that codes for a plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;

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c) a nucleic acid that hybridizes with a nucleic acid according to b);

d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e); or

g) ~~according to one of the Claims 1 to 3~~ or a nucleic acid with a sequence selected from the group consisting of ~~according to one of the~~ SEQ ID NO:-3, SEQ ID NO:4 and SEQ ID NO:-to-5 ~~and/or a fragment of this nucleic acid in~~ a plant cell to make a transformed plant cell; and  
B. ~~-regeneratingen of~~ a plant from the transformed plant cell.

16. A pProcess for the-influencing of-the nuclear base transporter properties of a plant, part of a plant and/or of seeds, comprising which includes the step:

-insertieng-of into a plant cell or plant a nucleic acid or fragment thereof that codes for a plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-

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deficient host cells with a plant or animal gene bank  
and selection of nuclear base transporter-positive  
host cells;

b) a nucleic acid with a sequence that  
codes for a protein having a sequence according to  
SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a  
nucleic acid according to b);

d) a nucleic acid that, in consideration of  
degeneration of the genetic code, would hybridize  
with a nucleic acid according to b) or with the  
sequence complementary to b);

e) a derivative of a nucleic acid according  
to a) to d) obtained through substitution, addition,  
inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a  
nucleic acid according to one of the groups a) to e);  
or

g) a nucleic acid with a sequence selected  
from the group consisting of SEQ ID NO:3, SEQ ID NO:4  
and SEQ ID NO:5.

~~a nucleic acid according to one of the  
Claims 1 to 3 or a nucleic acid with a sequence  
according to one of the SEQ ID NO 3 to 5 and/or a  
fragment of this nucleic acid into a plant cell  
and/or a plant.~~

17. A use of plant cells according to  
Claim 10 for the regeneration and manufacture of  
entire plants, wherein said plant cells comprise a

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nucleic acid or fragment thereof that codes for a  
plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable  
through complementation of nuclear base transporter-  
deficient host cells with a plant or animal gene bank  
and selection of nuclear base transporter-positive  
host cells;

b) a nucleic acid with a sequence that  
codes for a protein having a sequence according to  
SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a  
nucleic acid according to b);

d) a nucleic acid that, in consideration of  
degeneration of the genetic code, would hybridize  
with a nucleic acid according to b) or with the  
sequence complementary to b);

e) a derivative of a nucleic acid according  
to a) to d) obtained through substitution, addition,  
inversion and/or deletion of one or more bases; or

f) a nucleic acid complementary to a  
nucleic acid according to one of the groups a) to e);  
with the proviso that nucleic acids with a  
sequence according to one of the SEQ ID NO 3 to 5 are  
excluded.

18. A use of a nucleic acid or fragment  
thereof according to one of the Claims 1 to 3 or a  
nucleic acid with a sequence according to one of the  
SEQ ID NO 3 to 5 for the isolation of homologous  
sequences from bacteria, fungi, plants, animals

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and/or human beings, wherein said nucleic acid or  
fragment thereof codes for a plant or animal nuclear  
base transporter comprising:

a) a nucleic acid that is obtainable  
through complementation of nuclear base transporter-  
deficient host cells with a plant or animal gene bank  
and selection of nuclear base transporter-positive  
host cells;

b) a nucleic acid with a sequence that  
codes for a protein having a sequence according to  
SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a  
nucleic acid according to b);

d) a nucleic acid that, in consideration of  
degeneration of the genetic code, would hybridize  
with a nucleic acid according to b) or with the  
sequence complementary to b);

e) a derivative of a nucleic acid according  
to a) to d) obtained through substitution, addition,  
inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a  
nucleic acid according to one of the groups a) to e);  
or

g) a nucleic acid with a sequence selected  
from the group consisting of SEQ ID NO:3, SEQ ID NO:4  
and SEQ ID NO:5.

19. A use of a nucleic acid or fragment  
thereof according to one of the Claims 1 to 3 or a  
nucleic acid with a sequence according to one of the  
SEQ ID NO 3 to 5 for the expression of a nuclear base

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transporter in prokaryotic and/or eukaryotic cells,  
wherein said nucleic acid or fragment thereof codes  
for a plant or animal nuclear base transporter  
comprising:

a) a nucleic acid that is obtainable  
through complementation of nuclear base transporter-  
deficient host cells with a plant or animal gene bank  
and selection of nuclear base transporter-positive  
host cells;

b) a nucleic acid with a sequence that  
codes for a protein having a sequence according to  
SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a  
nucleic acid according to b);

d) a nucleic acid that, in consideration of  
degeneration of the genetic code, would hybridize  
with a nucleic acid according to b) or with the  
sequence complementary to b);

e) a derivative of a nucleic acid according  
to a) to d) obtained through substitution, addition,  
inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a  
nucleic acid according to one of the groups a) to e);  
or

g) a nucleic acid with a sequence selected  
from the group consisting of SEQ ID NO:3, SEQ ID NO:4  
and SEQ ID NO:5.

20. Use of a nucleic acid or fragment  
thereof according to one of the Claims 1 to 3 or a  
nucleic acid with a sequence according to one of the

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SEQ ID NO 3 to 5 under the control of a regulatory element in anti-sense orientation for the inhibition of the expression of an endogenous nuclear base transporter in prokaryotic or eukaryotic cells, wherein said nucleic acid or fragment thereof codes for a plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a nucleic acid according to b);

d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);  
or

g) a nucleic acid with a sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:4 and SEQ ID NO:5.

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21. A use of a nucleic acid or fragment thereof according to one of the Claims 1 to 3 or a nucleic acid with a sequence according to one of the SEQ ID NO 3 to 5 for the manufacture of useful transgenic plants, wherein said nucleic acid or fragment thereof codes for a plant or animal nuclear base transporter comprising:

a) a nucleic acid that is obtainable through complementation of nuclear base transporter-deficient host cells with a plant or animal gene bank and selection of nuclear base transporter-positive host cells;

b) a nucleic acid with a sequence that codes for a protein having a sequence according to SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a nucleic acid according to b);

d) a nucleic acid that, in consideration of degeneration of the genetic code, would hybridize with a nucleic acid according to b) or with the sequence complementary to b);

e) a derivative of a nucleic acid according to a) to d) obtained through substitution, addition, inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a nucleic acid according to one of the groups a) to e);  
or

g) a nucleic acid with a sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:4 and SEQ ID NO:5.

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22. A use of a nucleic acid  
~~according to one of the Claims 1 to 3 or a nucleic~~  
~~acid with a sequence according to one of the SEQ ID~~  
~~NO 3 to 5 for the identification of inhibitors of~~  
nuclear base transport, wherein said nucleic acid or  
fragment thereof codes for a plant or animal nuclear  
base transporter comprising:

a) a nucleic acid that is obtainable  
through complementation of nuclear base transporter-  
deficient host cells with a plant or animal gene bank  
and selection of nuclear base transporter-positive  
host cells;

b) a nucleic acid with a sequence that  
codes for a protein having a sequence according to  
SEQ ID NO:8 or SEQ ID NO:9;

c) a nucleic acid that hybridizes with a  
nucleic acid according to b);

d) a nucleic acid that, in consideration of  
degeneration of the genetic code, would hybridize  
with a nucleic acid according to b) or with the  
sequence complementary to b);

e) a derivative of a nucleic acid according  
to a) to d) obtained through substitution, addition,  
inversion and/or deletion of one or more bases;

f) a nucleic acid complementary to a  
nucleic acid according to one of the groups a) to e);  
or

g) a nucleic acid with a sequence selected from the  
group consisting of SEQ ID NO:3, SEQ ID NO:4 and SEQ  
ID NO:5.

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23. The nucleic acid fragment according to  
Claim 4 that includes at least 50 nucleotides.

24. The nucleic acid fragment according to  
Claim 4 that includes at least 200 nucleotides.

25. The construct according to Claim 6  
wherein said nucleic acid is a fragment characterized  
in that in anti-sense orientation to a promoter it  
can inhibit the expression of a nuclear base  
transporter in a host cell.

26. The construct according to Claim 7  
that is available in a plasmid.

27. The nucleic acid according to Claim 2  
that is a DNA.

28. The nucleic acid fragment according to  
Claim 4 the sequence of which includes a portion of  
coding sequence according to SEQ ID NO:1, 2, 6, 7, or  
10, or a derivative of a coding sequence according to  
SEQ ID NO:1, 2, 6, 7, or 10 derived through  
substitution, addition, inversion and/or deletion of  
one or more bases.

29. The host cell according to Claim 9  
that comprises or further comprises a nucleic acid  
with a sequence according to one of the SEQ ID NO 3  
to 5.

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31. The host cell according to Claim 9  
that comprises or further comprises a construct  
having a recited nucleic acid or nucleic acid  
fragment under the control of an element regulating  
expression.

32. The transgenic plant, transgenic plant part, seed or host cell according to Claim 11 that comprises or further comprises a nucleic acid having a sequence selected from the group consisting of SEQ ID NO:3, SEQ ID NO:4 and SEQ ID NO:5.

33. The transgenic plant, transgenic plant part, seed or host cell according to Claim 11 that comprises or further comprises a fragment of said nucleic acid.

34. The transgenic plant, transgenic plant part, seed or host cell according to Claim 11 that comprises or further comprises a construct having said nucleic acid sequence under the control of an element regulating expression.